

PATENT SPECIFICATION

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DRAWINGS ATTACHED

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(54) SLIDER FOR SLIDE FASTENERS HAVING COMPLEMENTARY INTER-LOCKABLE PROFILED STRIPS

(71) We, A/S MINIGRIP EUROPE, a Danish Body Corporate of Gullfossgade 4, Copenhagen, Denmark, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to a slider for slide fasteners suitable for bags such as shopping or tool bags.

The fastener concerned is of the type formed by two flexible closure strips having complementary ribs and groove structures which may be interlocked and also unlocked by resilient deformation under the action of the slider. The slider is tapered and has, at its widest part, a central partition for spacing the strips apart for opening or unlocking them when the slider is moved in one direction. Lateral converging walls are provided on the slider which embrace the closure strips and urge the strips to interlock when the slider is moved in the opposite direction.

The slider can be provided with flanges for engaging over shoulders on the strips for preventing the slider from being detached from the fastener and also for guiding it during sliding movements on the fastener. During assembly of such a slide fastener, it is normally necessary to push the slider on to the pair of closure strips from one end. This can lead to difficulties arising in some automatic processes used in manufacturing goods incorporating such fasteners.

There is known a process for the continuous manufacture of bags provided with such a fastener. The fastener strips are placed between the edges of a folded sheet of thin plastics material intended to form the bags, the whole being guided between the electrodes of a welding machine which effects intermittent welding of the said strips to the edges of the sheet. The folded sheet and attached strips is subjected at regular

intervals to transverse welding and cutting operations for forming the lateral edges of the bags. A difficulty arises when engaging a slider on the said fastener strips thus fixed to the edges of the bag. The transverse welding must be terminated clear of the lower edge of the profiled strips so as to make it possible to slide the slider over the end of the profiled strips. Having attached the slider, the ends must be secured together either by means of a second welding operation which completes the terminated transverse welding or by means of staples. This complication introduces undesirable delays in the manufacture of such bags.

The present invention relates to a slider, the use of which avoids this supplementary welding or stapling operation, and in accordance with the invention, there is provided a slider for a slide fastener which includes a pair of profiled complementary closure strips having an interlockable rib and groove structure which is lockable and unlockable upon appropriate sliding movements of the slider, the slider being made from an elastically deformable plastics material and comprising a plate carrying a pair of side walls, which converge along the length of the slider, and a central partition at the wider end of the slider which extends only part-way along the length of the slider and functions to separate and open the strips, when locked, upon the slider being moved in an unlocking direction, the slider having projections for engaging over shoulders provided on the closure strips to hold the slider on the strips and the side walls being capable of being spread apart from one another momentarily, to enable the slider to be pushed over the closure strips by a movement substantially perpendicular to the length of the strips, until the said projections snap into engagement with the said shoulders.

The invention also relates to a process for fitting the sliders on the fastener strips, such as during continuous manufacture of

bags, and to apparatus for carrying out the method.

By way of example, several embodiments of a slider according to the invention and also a device for the fitting of sliders are described and shown in the accompanying drawings.

Figures 1 and 2 show in perspective a first embodiment of the slider, viewed respectively from its two opposite ends;

Figures 3 and 4 show in cross-section respectively on III—III and IV—IV of Fig. 1 the slider engaged on the fastener strips;

Figures 5 and 6 show in perspective two other embodiments of the slider viewed from the widest end of the latter;

Figure 7 represents in horizontal section the device for fitting sliders in the course of manufacture of bags; and

Figures 8 and 9 are cross-sections respectively on VIII—VIII and IX—IX of Figure 7.

A slider for a fastener having complementary interlockable profiled strips is shown in Figures 1 to 4 and is intended to slide astride the profiled strips 1, 1¹, as indicated in Figures 3 and 4, for locking and unlocking. The slider consists of a plate 2, which rests on the upper edge of the profiled strips, two lateral divergent walls 3, 3¹, between which the strips 1, 1¹ are held, and a central partition 4 extending only part-way along the length of the slider from its wider end, the purpose of which is to part or unlock the strips, causing them to open when the slider is moved in the direction of the arrow f¹. Movement in the opposite direction indicated by the arrow f produces closing and re-locking of the strips in the narrower part of the slider, the strips 1, 1¹ interlocking with resilient deformation.

To prevent the slider from being inadvertently separated from the strips and to ensure satisfactory guiding during its sliding movements, the lower edges of the lateral walls 3, 3¹ have inwardly-projecting projections or flanges which engage over shoulders 5, 5¹ of the strips 1, 1¹ as seen in Figure 3. Also, as seen in Figure 4, the central partition 4 has projecting flanges which engage over shoulders 6, 6¹ of the strips 1, 1¹.

The slider is made of a material, preferably of moulded plastics material, which is sufficiently flexible to enable it to be fitted to the strips 1, 1¹ by urging it on to the strips 1, 1¹ in a transverse direction as indicated by the arrow F of Figures 3 and 4. The fitting of the slider on to the strips 1, 1¹ in this way, rather than fitting it from one end thereof by sliding in the direction of the length of the strips, possesses certain advantages which will appear hereinafter.

To enable the slider to be fitted, the lateral walls 3, 3¹ have to be resiliently spaced apart momentarily, and to facilitate this, the said flanges on the walls and on the central partition 4 have inclined lower faces which incline upwards towards the interior of recesses 7, 7¹ provided between the central partition 4 and the lateral walls 3, 3¹. When the slider is fitted, the strips 1, 1¹ are held in the said recesses. As shown in Figures 1, 2 or 4, the central partition 4 has a projecting rib 8 formed at its lower edge with an enlargement of triangular section 9, the enlargement having two inclined lower faces 11, 11¹ and two upper faces 10, 10¹ projecting perpendicular to the partition 4. The faces 10, 10¹ form the flanges for engaging under the shoulders 6, 6¹ of the strips 1, 1¹. At the narrower end of the slider, the lateral walls 3, 3¹ have two projecting ribs 12, 12¹, the lower edges of which (Figures 2 and 3) have triangular protrusions 13, 13¹ whose upper faces form the flanges which engage under the shoulders, 5, 5¹ of the strips 1, 1¹. Throughout the remainder of their length, the lower edges of the lateral walls 3, 3¹ are chamfered to facilitate their engagement on the fastener 1, 1¹.

It should be noted that the enlargement 9 of the central partition 4 and the protrusions 13, 13¹ associated with the lateral walls are not necessarily provided on the lower edges of these walls. They may instead be provided at intermediate positions on the inner faces of the lateral walls and on the two faces of the central partition depending upon the depth and form of the strips 1, 1¹, as indicated in dotted lines in Figures 1 and 2 at 21, 21¹ and 23, 23¹.

It should also be noted that the upper faces of the said enlargement and protrusions forming the said flanges are not necessarily perpendicular to the longitudinal plane of symmetry of the slider. These faces may be inclined inwardly and upwardly, which in certain cases may ensure better support of the strips 1, 1¹. Alternatively, the free edge of each flange may have an upstanding lip for engaging in a longitudinal accommodating groove provided in the shoulders of the profiled strips 1, 1¹.

In a modification shown in Figure 5, the enlargement 9, and protrusions 13, 13¹, are all located at the wider end of the slider. In the modification shown in Figure 6, which is intended to co-operate with strips 1, 1¹ having an asymmetrical profile in cross-section, only one protrusion 13₁ is provided, on one of the lateral walls 3, whilst an enlargement 9, of the same form as that shown in Fig. 1, is provided on the central partition 4. Again to co-operate with the asymmetrical strips, protrusions could be provided instead on both lateral

walls and an enlargement or protrusion projecting from only one side of the central partition 4. Instead of including an enlargement, the central partition may have a tapered inner edge.

The invention also concerns a process of fitting the sliders to profiled strips. In this process, the sliders are urged on to the strips by a movement at right angles to the lengthwise direction of the strips, rather than by a movement along their length in which the sliders are fitted from an end of the strips. The process is applicable to the continuous manufacture of bags of a type formed from a sheet of plastics material which is folded in half. A fastener is provided along one pair of edges—say the edges opposite the fold—for fastening together these edges. The remaining edges are closed together, for example by welding.

In the process, a folded sheet of plastics material is passed, simultaneously with a pair of complementary profiled strips 1, 1¹, between longitudinal welding electrodes whereby the strips are attached to the said sheet. A transverse welding and cutting electrode forms the closed ends of the bag during which step the passage of sheet and strips may be interrupted. The sliders are fitted after accomplishing the longitudinal welding but before the transverse welding, for example, during the intermittent stoppages.

The process will be further described with reference to Figures 7 to 9 which show apparatus for carrying out this process. The folded sheet is provided with fastener strips 1, 1¹, which are welded thereto by means of electrodes 14, 14¹. The sheet is advanced intermittently by distances equal to the widths of the bags to be formed, and the electrodes 14, 14¹ function also intermittently, each time welding together lengths of sheet and strip equal to the widths of the bags. The sheet and the attached strips pass on either side of a spacing element 15, preferably having an elongated and rounded form. The element 15 forces the strips previously welded to the sheet by the electrodes 14, 14¹ to open and separate. On either side of the spacer 15 are guiding elements 16, 16¹ formed for example of channel sections (Figure 8) facing each other and forming passages in which the strips 1, 1¹ are guided, normally without being gripped. However provision may be made for causing the device, comprising parts 15, 16 and 16¹, to lock onto strips 1, 1¹ to interrupt their movement at the moment of fitting the slider.

If however, the strips are welded to the sheet forming the bag without their first being interlocked, on leaving the electrodes 14, 14¹, the device 15, 16 and 16¹ will merely have to act as guide, and the shape

of the parts 15, 16 and 16¹ may be slightly modified in consequence, since the part 15 will no longer have to force the strips apart.

Following the spacing and guiding device 15, 16 and 16¹ and at a distance therefrom somewhat exceeding the length of the slider are two movable clamping and guiding parts 17, 17¹, also of channel section, which form a recess for guiding the two strips 1, 1¹. The strips are arranged to be clamped in their closed position by the parts 17, 17¹ and are prevented, possibly by suitable locking means, from displacement during the engagement of the slider which, despite its resilient nature, exerts a considerable force on them. It is arranged that the angle included by the two strips 1, 1¹ in the region between the parts 15, 16, 16¹ and clamping and guiding device 17, 17¹ is the same as the angle included when the slider is fitted.

The sliders are engaged on the strips 1, 1¹ between the spacer 15 and the device 17, 17¹ either manually or preferably by means of an automatic device, comprising a charger 18, shown in dotted lines and provided with a pusher for forcing successive sliders on to the strips 1, 1¹ while firmly held between the guiding and clamping device 17, 17¹. The device 17, 17¹ opens intermittently to permit the folded sheet now provided with fastener strips and slider to advance towards the transverse welding and cutting electrode 19, 20; movements of the device 17, 17¹, as well as that of the pusher of the charger 18 may be synchronised with the functioning of the electrodes 14, 14¹. Closure of the device 17, 17¹ may also take place immediately after the passage of the slider, so as immediately to reclose the profiled strips and ensure register thereof at the crossing of the transverse welding. If fitting of the sliders is to be effected during operation without intermittent stoppage of the strips, the parts 17, 17¹ will not lock onto the strips 1, 1¹ and will ensure just sufficient clamping for guiding and supporting the profiled strips 1, 1¹ during the engagement of the slider without impeding the advance movement of the strips.

WHAT WE CLAIM IS:—

1. A method of positioning the slider of a slide fastener astride a pair of profiled complementary closure strips having an interlockable rib and groove structure, the slider comprising a plate carrying a pair of side walls which converge along the length of the slider and a central partition to separate and open the interlocked closure strips, the slider having projections for engaging over shoulders provided on the closure strips and being formed of an elastically-deformable plastics materials which en-

ables the side walls to be moved resiliently apart, the method consisting of moving the slider on to the pair of closure strips by a movement substantially perpendicular to the length of the strips such that the side walls are spread apart momentarily until the projections snap into engagement with the shoulders on the closure strips.

2. A method as claimed in claim 1 used in the continuous manufacture of bags from folded plastics sheet material, in which the moving folded sheet, with closure strips on the edges thereof remote from the fold, is intermittently transversely welded and severed into individual bags, the sliders being intermittently fitted astride the closure strips at such intervals that between the fitting of one slider and the next, the moving folded sheet moves a distance corresponding to the width of a bag.

3. A method as claimed in claim 2, wherein the fitting of the sliders is effected at the same instant as the transverse welding and severing of the folded sheet into individual bags takes place.

4. A slider for a slide fastener which includes a pair of profiled complementary closure strips having an interlockable rib and groove structure which is lockable and unlockable upon appropriate sliding movements of the slider, the slider being made from an elastically-deformable plastics material and comprising a plate carrying a pair of side walls which converge along the length of the slider and a central partition at the wider end of the slider which extends only part-way along the length of the slider and functions to separate and open the strips, when locked, upon the slider being moved in an unlocking direction, the slider having projections for engaging over shoulders provided on the closure strips to hold the slider on the strips and the side walls being capable of being spread apart from one another momentarily to enable the slider to be pushed over the closure strips by a movement substantially perpendicular to the length of the strips, until the said projections snap into engagement with the said shoulders.

5. A slider as claimed in claim 4, wherein the projections comprise a projection on either or both of the side walls.

6. A slider as claimed in claims 4 or 5, wherein the projections comprise at least one projection on the central partition.

7. A slider as claimed in claim 5 or 6 wherein the undersides of the projections are bevelled in such a way that the cross-sections of the recesses between the walls and the central partition in the region of the projections, into which recesses the closure strips enter when the slider is pushed thereon, decrease gradually in the direction of movement of the strips into the recesses.

8. A slider as claimed in any of claims 5, 6 or 7, wherein the projections are situated at the lower edge of the slider remote from the said plate.

9. A slider as claimed in any of claims 4 to 8 wherein the lower edge of each of the side walls is bevelled along its inner side.

10. A slider according to claim 4, wherein each side wall has an inwardly-directed projection for engaging the said shoulders and the central projection has a pair of outwardly-directed projections extending from either side thereof for engaging the said shoulders, the projections being located at the lowermost end of the walls and the partition remote from the plate of the slider.

11. A slider according to claim 10, wherein the side walls and central partition are extended lengthwise beyond the plate by ribs on which the said projections are located.

12. A slider according to claim 10 or 11, wherein the two projections on the central partition are each bevelled on their undersides, the two projections forming an enlargement of triangular cross-section.

13. A slider as claimed in any of claims 5 to 8, 10, 11 or 12, wherein the or each projection has an upstanding lip for engagement with a groove provided therefor in the shoulder of the or each closure strip.

14. A slider for a slide fastener constructed and arranged substantially as herein described with reference to and as shown in Figures 1 to 6 of the accompanying drawings.

15. A device for carrying out the method as claimed in any one of claims 1 to 3, having two spaced guiding and supporting devices for the closure strips, one of the said devices being to separate the closure strips from each other, whilst the other holds the closure strips in engagement with each other, the spacing between the two devices being somewhat greater than that between the overall length of the slider and such that the closure strips include an angle which substantially corresponds to the angle which the closure strips include when fitted in the interior of the slider, and means for feeding and fitting a slider to the strips located between the two guide arrangements.

16. A device as claimed in claim 15 used in the continuous manufacture of bags from folded plastics material in which the moving folded sheet, with closure strips on the edges thereof remote from the fold, is intermittently transversely welded and severed into individual bags, wherein the device includes means for clamping and immobilizing the closure strips and the folded

sheet during the fitting of the slider.

17. A device as claimed in claim 15 or 16, wherein a first of said guide devices consists of a fixed separating element located between two members which form guide channels for the two closure strips, the second of the said devices consisting of two further members which are movable together to hold the closure strips in engagement with each other, means for the control of movement of the two further members being provided to urge them against the closure strips to immobilise the strips during the fitting of a slider.

18. A device as claimed in claim 17, wherein the control means which control the two further members and which hold the closure strips in engagement with each other during fitting of the slider are arranged to open the two further members sufficiently wide after fitting the slider as to permit the strips and slider to pass therebetween.

19. A device as claimed in claim 17 or 18, wherein the two members of the first of the said devices are controllably

movable towards each other so as to clamp the closure strips during fitting of a slider thereto

20. A device as claimed in any one of claims 16 to 19, including means for synchronizing the means for feeding and fitting sliders to the strips with the clamping of the strips.

21. A device as claimed in claim 20, wherein means for feeding and fitting sliders are synchronized with the clamping of the strips and are additionally synchronized with the working of welding electrodes which weld the closure strips to the said edges of the folded sheet forming the walls of a bag.

22. A device as claimed in any one of claims 15 to 21, wherein the said guiding and supporting arrangements include jaws of U-shaped cross section which receive the two closure strips.

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COMPLETE SPECIFICATION

1 SHEET

This drawing is a reproduction of
the Original on a reduced scale

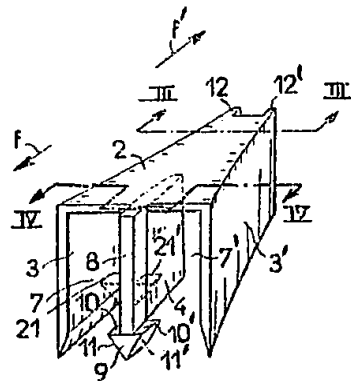


FIG. 1

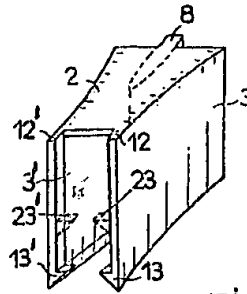


FIG. 2

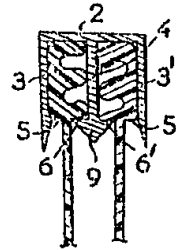


FIG. 3

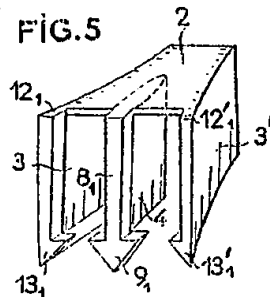


FIG. 4

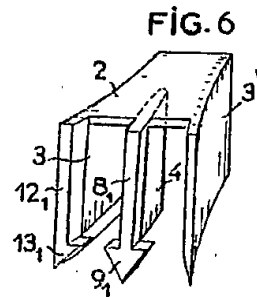


FIG. 5

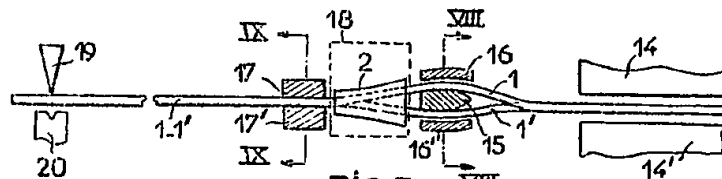


FIG. 6

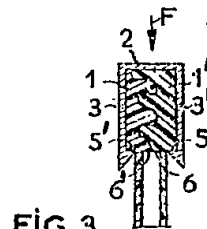


FIG. 7

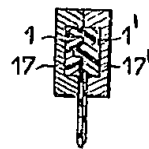


FIG. 8

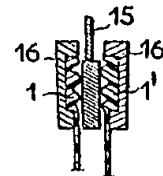


FIG. 9